

ANNALS of CARNEGIE MUSEUM

4400 FORBES AVENUE • PITTSBURGH, PENNSYLVANIA 15213

VOLUME 44

DECEMBER 20, 1972

ARTICLE 4

CELASTRINA EBENINA, A NEW SPECIES OF LYCAENIDAE (LEPIDOPTERA) FROM THE EASTERN UNITED STATES

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Just over a century ago, in the spring of 1867, William Henry Edwards collected the first known specimens of a curious *Celastrina*. They looked like the common spring form of the Coalburg (West Virginia) area, "violacea"¹, of *Celastrina pseudargiolus pseudargiolus* Boisduval & Le Conte, with which he found them, except that the upper surfaces were black instead of blue-violet.

Edwards (1869*)² at first assumed that his specimens were females, but later (1878*) he reported that an examination of the genitalia of several specimens showed them to be males. Still later (June, 1884*) he gave the name "nigra" to what he still believed to be a dimorphic male form of "violacea."

He apparently never realized that there were females corresponding to the males, just as distinctive but not so strikingly different from female "violacea." He had several of these females in his collection, but he simply labeled them as "violacea var. of blue♀," and so far as I can determine he never mentioned them in print.

Strecker (1878*), however, briefly described an "ab. ♀" that may

¹Technically this should be called "pseudargiolus," since the species was described from spring individuals. To lessen confusion, however, I here use *pseudargiolus* for the species and nominate subspecies, and "violacea" for the spring form of the latter.

²References with dates followed by an asterisk (*) appear only in the synonymy of *ebenina*. Those without the asterisk will be found in "References Cited."

Submitted for publication January 31, 1972.

be the female (which it usually has been assumed to be). He said it was "a form intermediate in colour of upper surface between the blue and brown female [Strecker had not yet seen Edwards's correction of the sex of the dark "form"], neither one nor the other but partaking in a measure of the characteristics of both."

Little has been learned about this strange *Celastrina* since. When referred to at all, it has been called a form of *pseudargiolus*. Forbes (1960*) is the only one to have definitely associated the female (generally called "intermedia" but see below) with the male. For some years I have suspected that this so-called form might be a valid species, but until recently my acquaintance with it was limited almost entirely to museum specimens. In May, 1970, on a trip to southern Ohio, I found a colony of it, and this has prompted me to examine the problem in detail.

The abbreviation CM designates Carnegie Museum.

Celastrina ebenina, new species

- Lycaena violacea* Edwards (unnamed "♀" form): Edwards 1869, Butterflies of North America 1: [149], pl. [49] fig. 4.
- Lycaena violacea* (unnamed ♂ form): Edwards 1878, Canad. Ent. 10: 80.
- Lycaena lucia* Kirby ("ab. a. ♀ Nig." and "ab. b. ♀ Intermedia"): Strecker 1878, Butterflies and Moths of N. Am.: 95 (see below).
- Lycaena pseudargiolus* Bdv. & Le C., form *violacea*, dimorphic black ♂: Edwards 1883, Papilio 3: 85-97.
- Lycaena pseudargiolus*, winter form *violacea*, dimorphic ♂ form *nigra* Edwards, June 1884, Butterflies of North America 2: [315], pl. [50] fig. 7; *ibid.* [Dec. 1884-Jan. 1885], Trans. American Ent. Soc. 11: 306.
- Cyaniris pseudargiolus violacea* [male form] *nigra*: Scudder 1889, Butterflies New England 2: 928, ff.
- Lycaena pseudargiolus* [form] *violacea*, var. *nigra*: Blatchley 1892, Ann. Rept. Indiana State Geologist 17: 396-397.
- Lycaena pseudargiolus* form *nigra*: Holland 1898, Butterfly Book: 267, pl. 31 fig. 4 (the specimen illustrated is one of the paratypes of *ebenina*: see below).
- Lycaena pseudargiolus* var. *nigra*: Skinner 1898, Syn. Cat. N. Amer. Rhop.: 58.
- Cyaniris ladon ladon* Cramer: Dyar [1903], U. S. Nat. Mus., Bull. 52 ("1902"): 45, no. 440 (name "nig" not mentioned; "intermedia" and "nigra" listed as synonyms).
- Cyaniris ladon* var. *nigra*: Engel 1908, Ann. Carnegie Mus. 5: 35.
- Celastrina argiolus* var. *pseudargiolus* ab. *nigra*: Tutt 1908, Nat. Hist. British Lep. 9: 419.
- Lycaenopsis pseudargiolus pseudargiolus* form ♂ *nigra* and form ♀ *intermedia*: Barnes & McDunnough 1917, Check List Lep. Boreal America: 17.
- Cyaniris ladon* form *nigra*: Draudt 1921, in Seitz, Grossschmett. Erde 5: 818, pl. 144 i (genus and species name corrected 1924, *op. cit.*: 1045, to *Lycaenopsis pseudargiolus*).
- Lycaenopsis pseudargiolus pseudargiolus* form ♂ *nig* (with *nigra* a syn.) and form ♀ *intermedia*: Barnes & Benjamin 1926, Bull. S. Calif. Acad. Sci. 25: 20 (of reprint), no. 458; McDunnough 1938, Mem. S. Calif. Acad. Sci. 1: 28, no. 475.
- Lycaena* (*Lycaenopsis*) *pseudargiolus* var. *nigra*: Holland 1931, Butterfly Book (rev. ed.): 256, pl. 31 fig. 4.
- Cyaniris argiolus pseudargiolus* [form ♂] *nigra* and [form ♀] *intermedia*: Clark & Clark 1951, Smithsonian Misc. Coll. 116 (7): 73.
- Plebeius argiolus pseudargiolus*, "race or rather local variety" *nigra* ("female *intermedia*

- Strecker" listed as synonym): Forbes 1960, Cornell Univ. Agr. Exp. Sta., Mem. 371: 126-127.
- Lycaena lucia*, ab. ♀ *intermedia*: Comstock & Huntington 1960, J. New York Ent. Soc. 68: 236.
- Lycaena lucia*, ab. ♀ *nig*: Comstock & Huntington 1961, J. New York Ent. Soc. 69: 194.
- Lycaena pseudargiolus* winter form *violacea* dimorphic ♂ *nigra*: Comstock & Huntington 1961, J. New York Ent. Soc. 69: 194.
- Celastrina argiolus pseudargiolus* form ♂ *nig* and form ♀ *intermedia*: dos Passos 1964, Lepid. Soc., Mem. 1: 69, no. 481.
- Celastrina* [sic] *argiolus pseudargiolus* (*Lycaena nigra*): Brown 1970, Trans. American Ent. Soc. 96: (423), 424, ff., fig. 32.

DISCUSSION OF SYNONYMY

The two names attributed to Strecker ("nig" and "intermedia") are in my opinion *nomina nuda*. Strecker (1878*) never intended them as taxonomic names but simply as Latin descriptives. This is evident because they do not have "nob." [= nobis] after them and because they (and other descriptives in the same work) are not listed in his later catalogue of the type specimens in his collection [Strecker 1872-1900 (1900, Suppl. 3)]. Later uses of these two descriptives as names are either in synonymy (e.g., Dyar [1903]*) or are without description or indication, so the names must be treated as *nomina nuda* and attributed not to Strecker but to whoever first used them as names. If we were to follow the International Code (ICZN 1964), they would become "intermedia" Dyar [1903]* and "nig" Barnes & Benjamin, 1926*. This, however, is dubious practice because both names, when they have been used at all, have been accorded infrasubspecific rank, have no standing under the Code [ICZN 1964: Art. 1 and Art. 45(c)] and are excluded (Art. 1) from its rules.

The name "nigra" is not quite so beclouded: at least Edwards proposed it as a taxonomic name. It was, however, proposed in a clearly infrasubspecific way and has been universally so used ever since. Although this name has no standing under the Code, and therefore technically needs no type specimen, it has been used often enough in the past to have acquired a standing in tradition, and hence a type would be useful. In conjunction with F. Martin Brown's studies of the Edwards types, I selected a lectotype (fig. 1 this article; also Brown, 1970*: fig. 32), a male from the W. H. Edwards collection, labeled in Edwards's hand, "Violacea-/nigra ♂ / April. Coalb." (Brown, 1970*).

Brown (1970*) uses the combination "*Lycaena nigra*" as a heading, but since he expressly (*ibid.*: 420) includes all North American *Celastrina* under a single species, and lists "*Lycaena nigra*" under *C. argiolus pseudargiolus*, this cannot be taken as an elevation of "nigra" to species status.

In changing the status of this form to full species here, nomenclatorially I have a choice of two courses: I could use the name "nigra" of

Edwards, in which case [ICZN 1964: Art. 10(b)] I would make it available for the first time and it would take the present date and my authorship; or I could propose a new name entirely, since there is currently no available name for the species. I have chosen the second course to avoid the confusion that might result from two identical names with different authors within the same closely related group. In order to reinforce the identity of my name *ebenina* and Edwards's "nigra," however, I am designating the lectotype of "nigra" simultaneously as the holotype of *ebenina*.



Fig. 1. *Celastrina ebenina*, n. sp., ♂ holotype. This specimen is also the lectotype of the name "nigra" Edwards. Scale at bottom is in millimeters.

DESCRIPTION (figs. 1-5)

MALE UPSIDE: uniform blackish brown when fresh, fading to brown in older specimens. Rarely, a few dark blue scales may be present, particularly on the hindwing in some of the areas normally blue in the female. Inner margin of hindwing fuscous to gray. Fringe dingy white, checked with fuscous on vein-ends; the width of the fuscous parts is subequal to the intervening white on the forewing, but much thinner than the white on the hindwing. No androconial scales are present.

FEMALE UPSIDE: both wings slightly lustrous pale gray-blue, heavily marked with fuscous as follows: forewing broadly on costa, inward to M_1 and including nearly all the discal cell (all but the posterodistal corner); broadly on termen, covering the outer third of vein M_3 ; and in base distad to about the origin of Cu_2 or a little before; hindwing broadly on costa, inward to M_1 (but sometimes with a small area of blue in $Rs-M_1$) and costal cell vein; in base distad to about middle of cell, and (more blackish) along vein 2A from base to near termen, gradually fading inward before reaching Cu_2 . Inner margin itself ashy white. A fuscous complex terminal border consists of the following: a fine black terminal line (which does not fade to brown with age); an adterminal series of round or oval fuscous spots separated from the terminal line by a thin line of dull pale blue interrupted by fuscous at the veins; a series of dull pale blue crescents capping the adterminal spots, from M_1 to 2A; and basad of the crescents a crenulate fuscous subterminal band, normally about as thick as the adterminal spots but a little paler. On each wing there is a long, slender, cell-end bar, and all veins crossing the blue are thinly fuscous. Fringe as in the male.

MALE UNDERSIDE: almost exactly as in "violacea" (i.e., the spring brood of *C. p. pseudargiolus*). The pale ashy ground is the same; the fuscous pattern elements are the same in character and disposition except that the adterminal spots are noticeably larger and show no tendency to fade costad, and there is no evidence of the "marginata"-like blurring of the marginal elements sometimes found in "violacea" in varying degrees (and which becomes characteristic of the spring brood of *pseudargiolus lucia* Kirby farther north). In "violacea" the basal and pm spots are often much darker than the marginal pattern elements. This is less often true in *ebenina*, but it does occur.

FEMALE UNDERSIDE: as in the male.

MALE GENITALIA (fig. 10): identical to those of *C. p. pseudargiolus* (fig. 11).

HOLOTYPE: male, Coalburg, Kanawha Co., West Virginia, April, leg. W. H. Edwards. This specimen is also the lectotype of *Lycaena pseudargiolus* winter form *violacea*, dimorphic ♂ form *nigra* Edwards, 1884 (see above).

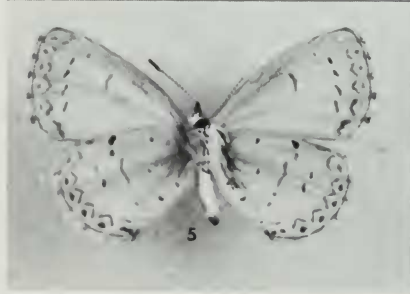
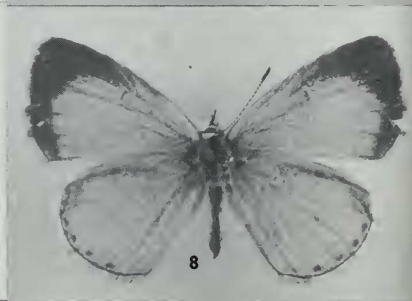
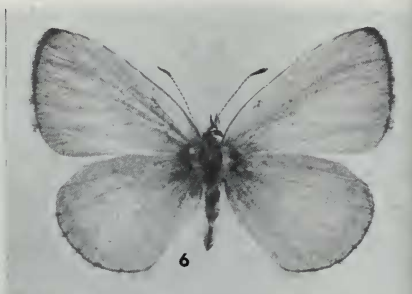
PARATYPES: From the collection of W. H. Edwards: 6♂, labeled "violacea ♂" or "violacea-nigra ♂" and "Coalb." or "Kan^a," bearing various dates in April 1871, 1872, 1879, 1881, 1884 or no date. One of these is illustrated by Holland, 1898*, pl. 31 fig. 4, and another by Holland, 1915, pl. xcii fig. 4; 1♀, labeled "violacea ♀ aberr. March Coalb."

From the collection of T. L. Mead: 13♂, mostly labeled "violacea Brown ♀" and "W Va," dated 17, 23, 27 April 1872; and 5♀, labeled "violacea var. of Blue ♀" and "W Va," dated 24, 26, 27 April 1872.

From the collection of W. J. Holland: 11♂, labeled simply "W. Va." One of these additionally labeled ♂ genitalia slide C-757 [HKC].

All the above paratypes are presumed to have been taken in the vicinity of Coalburg, Kanawha Co., West Virginia.

Holotype, 30 ♂ and 6 ♀ paratypes, CM Ent. type series no. 671.



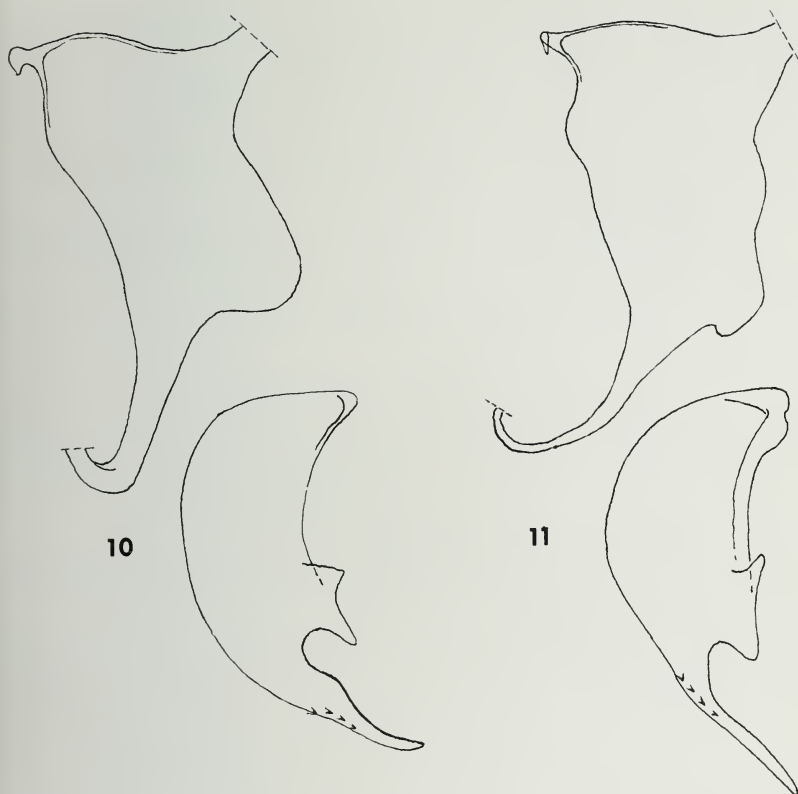


Fig. 10. *Celastrina ebenina*, n. sp., ♂ genitalia. Preparation C-756, Pittsburgh, Allegheny Co., Pa., 2.vi.1908, collector unknown. The top illustration is the right side of the genital ring, from about the dorsal midline (top dashed line) to just beyond the ventral limit (bottom dashed line). The bottom figure is the left valva. Fig. 11. *Celastrina pseudargiolus*, summer form, ♂ genitalia. Preparation C-784, 8 mi S of Columbus, Chattahoochee Co., Ga., 2.vii.1944, leg. H. K. Clench. Structures shown are the same as in fig. 10.

Fig. 2. *Celastrina ebenina*, n. sp., ♂. [5 mi N of] New Brighton, Beaver Co., Pa., 10.iv.1903, leg. H. D. Merrick. Fig. 3. Underside of preceding specimen. Fig. 4. *Celastrina ebenina*, n. sp., ♀. [5 mi N of] New Brighton, Beaver Co., Pa., 13.v.1900, leg. H. D. Merrick. Fig. 5. Underside of preceding specimen. Fig. 6. *Celastrina pseudargiolus pseudargiolus*, spring form "violacea," ♂. Oak Station [= vic. Mt. Lebanon], Allegheny Co., Pa., 20.iv.1902, leg. F. Marloff. Fig. 7. Underside of preceding specimen. Fig. 8. *Celastrina pseudargiolus pseudargiolus*, spring form "violacea," ♀. Oak Station, Allegheny Co., Pa., 2.v.1906, leg. F. Marloff. Fig. 9. Underside of preceding specimen.

REMARKS

Celastrina ebenina appears to be single brooded and flies in the early spring, at about the same time as *C. p. pseudargiolus*, spring brood "violacea."

COMPARISON WITH "violacea": Since "violacea" flies at the same time and in the same places as *ebenina*, and since "violacea" resembles *ebenina* more than any other form of *pseudargiolus* does, I give here a detailed comparison of the two (compare figs 2 to 5, *ebenina*, and 6 to 9, "violacea"):

(1) Androconia: present on the forewing upperside in male "violacea" (and all other *pseudargiolus* males), absent in male *ebenina*.

(2) Male upperside ground: blue-violet in "violacea," brown-black in *ebenina*.

(3) Female upperside ground: lustrous, bright violet-blue in "violacea," duller, pale gray-blue in *ebenina*.

(4) Female upperside, forewing costal border: gray to bluish on basal half or two-thirds of costa, and discal cell entirely bright blue, in "violacea"; fuscous all the way to base, and covering most of discal cell, in *ebenina*.

(5) Female upperside, forewing terminal fuscous border: thin (covers outer fourth of vein M_3) in "violacea," thick (covers outer third of M_3) in *ebenina*.

(6) Female upperside, basal areas of both wings: blue in "violacea," fuscous in *ebenina*.

(7) Female upperside, cell-end bar of forewing: absent, faint or short (costal half of cell-end), rarely long, in "violacea"; always strong and long in *ebenina*.

(8) Female upperside, cell-end bar of hindwing: absent in "violacea" (and virtually so in all other *pseudargiolus* forms), strong and long in *ebenina*.

(9) Female upperside, costal border of hindwing: bluish gray, darkening to fuscous narrowly along costa in "violacea," heavy fuscous from costa inward to costal cell-vein and usually to M_1 in *ebenina*.

(10) Female upperside, terminal border of hindwing: only a row of small adterminal fuscous spots in "violacea," a row of large adterminal fuscous spots and a thick subterminal fuscous band in *ebenina*.

(11) Female upperside, veins in blue areas of both wings: concolorous with blue ground in "violacea," narrowly fuscous in *ebenina*.

(12) Both sexes underside, adterminal spots of hindwing: minute points, usually fading costad, in "violacea," about twice as large, and not fading costad, in *ebenina*.

(13) Both sexes underside, "marginata"-like blurring (infuscation) of marginal pattern elements, especially of hindwing: absent to slight, rarely moderately strong, in "violacea," absent completely in *ebenina*.

REGIONAL VARIATION: There is some indication that minor differences in the upperside pattern of the females may exist among different populations of *ebenina*. In West Virginia (Coalburg, 7♀ seen), the blue ground is usually uniform (lightened discally on the forewings of one specimen) and the blue lunules in the hindwing terminal border are thick; in western Pennsylvania (3♀ seen) the blue ground is uniform but the blue lunules are usually thin; in Ohio (Vinton Co., 2♀ seen) the blue ground is lightened almost to white in the disc of the forewings and distally on the hindwings, and the blue lunules of the hindwing are thick. Larger series are needed to determine whether or not these differences are constant.

KNOWN LOCALITIES

PENNSYLVANIA: Allegheny Co.: Allegheny [Pittsburgh North Side], *leg.* Herman Lipold, *ex coll.* Henry Engel (1♂, CM); Pittsburgh, 25.iv-10.v, all 1900-1901, *leg.* Frank Knechtel, George Ehrmann, and Henry Engel (4♂2♀, CM).—Beaver Co.: no further data, 14, 21.iv [no year], *leg.* Henry Engel (3♂, CM); New Brighton [5 mi N, see Engel 1908*], 10.iv-13.v, 1900-1905, all *leg.* H. D. Merrick, *ex coll.* H. Engel (1♂, CM) and *ex coll.* Acad. Nat. Sci., Philadelphia (6♂1♀, CM).—Lawrence Co.: Slippery Rock Creek, 5.v.1961, *leg.* J. Bauer and H. Clench (1♂, CM); same, 11.v.1961, *leg.* J. Bauer (1♂, CM).

- OHIO: Vinton Co.: 2.5 mi E Zaleski, 10.v.1970, *leg.* H. Clench (3♂ 2♀, CM).
- INDIANA: Wabash Co.: "The black male, var. *nigra* of *violacea*, has been taken by the writer in Wabash County, but is not reported elsewhere." (Blatchley 1892*)
- MARYLAND: Washington Co.: nr. Sandy Hook [across the Potomac R. from Harper's Ferry], 9.iv.1968, 16.iv.1970, *leg.* John Mason (2♂, CM).
- VIRGINIA: Frederick Co.: "western Frederick Co. (not common)" and "west of Cross Jct. on the West Virginia line," 24.iv.1938 (Clark & Clark 1951*).
- WEST VIRGINIA: Pendleton Co.: vic. Franklin, 3-5.v.1952 and 28.iv.1954, *leg.* S. S. Nicolay (2♂2♀, CM).—Kanawha Co.: Coalburg (see type series of *ebenina*).
- NORTH CAROLINA: Buncombe Co.: road no. 2178, 3100 ft., ca. 6 mi SSE Barnardsville, 29.iv.1972, *leg.* R. E. Price, Jr. (2♂, CM). Edwards (1883*: 87) stated that according to H. K. Morrison the "black form" [*ebenina*] occurred in North Carolina, but until Mr. Price's material came to hand I knew of no documenting specimens.

DOUBTFUL LOCALITIES

- NEW YORK: vic. New York City (Scudder 1889*).
- TENNESSEE: Vaguely attributed to this state, North Carolina, and Georgia by Edwards (1883*: 87) and repeated in Edwards (June 1884*) and Scudder (1889*). I know of no specimens, but in the light of Price's discovery of *ebenina* in North Carolina, its presence in Tennessee becomes much more probable.
- GEORGIA: See preceding.
- COLORADO: Edwards (1883*: June 1884*) records a "melanic male" taken by Morrison in southern Colorado. A male of *ebenina* so labeled is in the Edwards collection and documents this, but I strongly suspect that this specimen was somehow accidentally mislabeled. Morrison's shipment reached Edwards in the middle of the latter's great interest in and study of *pseudargiolus* and its forms (cf. Edwards 1883*, prefatory note) and one of Edwards's specimens might well have gotten accidentally into the Morrison lot. Brown, Eff & Rotger [1954-1956 (1955): 176] do not mention *ebenina*, nor have I ever seen another Colorado specimen.

DISTRIBUTION AND HABITAT

As the above records indicate, *ebenina* occurs in a small area (fig. 12) from central Maryland west to Indiana and from just north of Pittsburgh south to the mountains of North Carolina. Within this area *ebenina* is intensely local and colonies are few, although undoubtedly more numerous than we know. Within this same area (and beyond) *C. pseudargiolus* is almost ubiquitous in and near wooded areas. Where something is known of their environments, the localities where *ebenina* occurs are all cool, moist, forested ravines. *Trillium grandiflorum* seems to be a common, perhaps universal, constituent of the habitats and is in flower when *ebenina* is flying. This description holds specifically for the Washington Co., Maryland, record; the Pendleton Co., West Virginia, record; the Lawrence Co., Pennsylvania, record; the Buncombe Co., North Carolina, record; and the Vinton Co., Ohio, record. Such ravines are fairly common in the Pittsburgh area and near Coalburg, West Virginia, so it is reasonable to suppose that *ebenina* was taken in similar environments in those areas. Nothing is known of its habitat in other localities.

A striking parallel to *ebenina* in many of its attributes is the Ravine

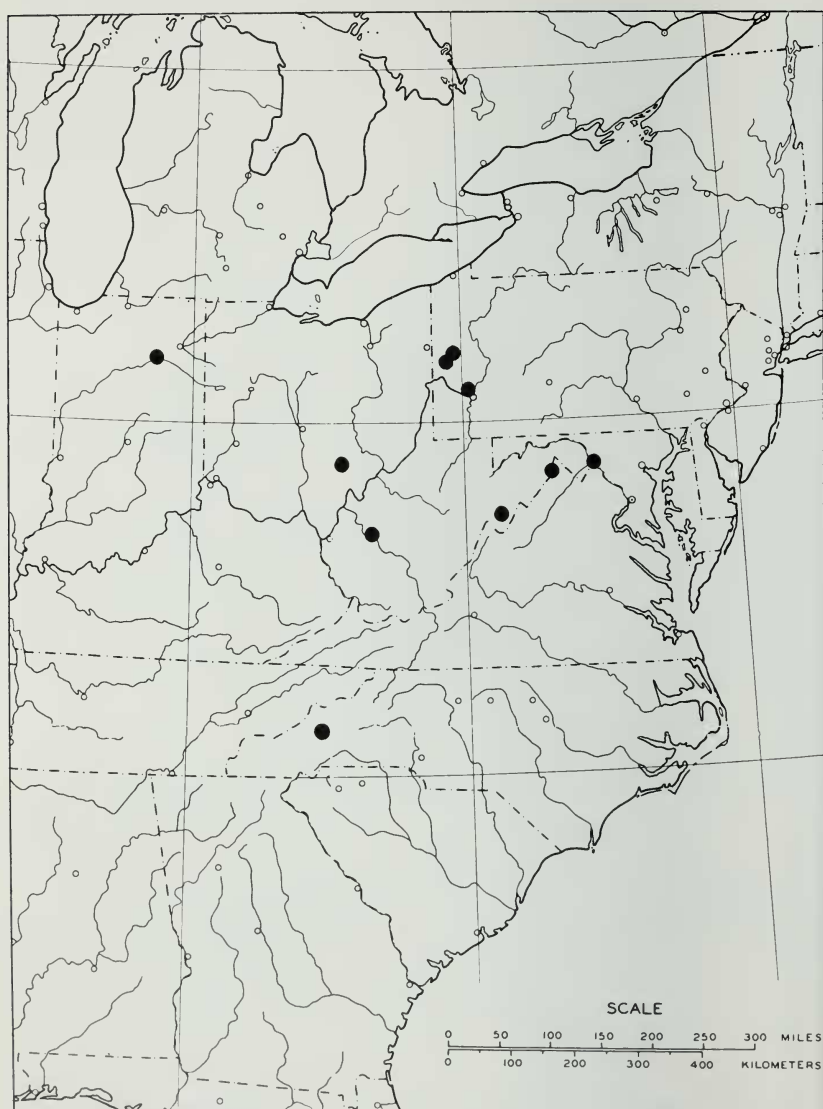


Fig. 12. Known distribution of *Celastrina ebenina*, n. sp.

Salamander, *Plethodon richmondi* Netting & Mittleman (1938), named after my colleague Neil D. Richmond, Curator of Environmental Studies at Carnegie Museum. Mr. Richmond informs me that their distributions are remarkably similar [compare *P. richmondi* (Highton 1962; Highton & Worthington 1967) and *ebenina* (fig. 12)]. Like *ebenina*, *P. richmondi* occurs in cool, forested ravines (Netting & Mittleman 1938; Highton & Worthington 1967) and is quite local in occurrence. *P. richmondi*, further, is extremely similar to and geographically sympatric with a common, widespread, polymorphic species, *Plethodon cinereus* (Green), with which it was long supposed to be conspecific. At this point I can neither explain this many-sided analogy nor put it to any speculative use, but it is too interesting to omit.

STATUS

Whether *ebenina* is a form of *pseudargiolus*, as heretofore believed, or a full species is a question central to the present paper and important biologically. It needs careful consideration.

More than tradition supports the hypothesis that *ebenina* is simply a morph of *pseudargiolus*. It resembles the regional spring form "violacea" of nominate *pseudargiolus* closely on the underside, and wherever *ebenina* has been taken "violacea" has been found with it in the strictest sense. The small colony of *ebenina* that I found in Ohio occupied only a small area, perhaps no more than a hundred by twenty or thirty feet, yet in precisely the same area I also took two female "violacea," and I saw neither "violacea" nor *ebenina* anywhere else in that vicinity. The male genitalia appear to be inseparable from those of sympatric *pseudargiolus*, all the more significant since the male genitalia of *pseudargiolus* show minor but constant geographical variation.

The hypothesis that *ebenina* is a full and independent species is, however, supported by numerous points and in my opinion these far outweigh the preceding factors. First, the pattern of *ebenina* is consistently and strikingly different, not just on the upper surface but also in minor details of the under surface (notably the enlarged adterminal spots of the hindwing) in both sexes. Second, males completely lack the androconial scales on the upper surface that are always found in male *pseudargiolus*. Third, *ebenina* is differentiated from "violacea" by multiple traits and no intermediates between the two are known. Fourth, the distribution of *ebenina* suggests a species far more than a form: its range is small, while that of *pseudargiolus* is vast; within its area *ebenina* is extremely local, while within the same area *pseudargiolus* is virtually ubiquitous in wooded places; and yet, despite the intense localization of *ebenina*, when one finds a colony the individuals are usually rather numerous. Fifth, there is some evidence that locally *ebenina* has a flight period slightly later than that of *pseudargiolus*.

This is suggested by Edwards's (1869*) remarks ("... for the females do not appear until some days after [the males]... Most of the females are of the black type [*i.e.*, *ebenina* ♂]..."), and by the condition of the specimens of both *ebenina* and *pseudargiolus* that I took together in Ohio. Finally, the possible minor geographic variation of *ebenina* briefly described above is consistent with the hypothesis of a distinct species dispersed in small, widely separated colonies between which gene flow must be extremely low at best. The populations of *pseudargiolus* are much more panmictic and show no local geographic differentiation on this small scale.

ACKNOWLEDGMENTS

I am grateful to the following for their assistance: Mr. F. Martin Brown, for reading and commenting on an early draft of the manuscript and for taking the photographs that illustrate this paper; Dr. John Mason, Kensington, Maryland, Mr. S. S. Nicolay, Virginia Beach, Virginia, and Mr. R. E. Price, Jr., Mars Hill, North Carolina, for furnishing additional locality records of *ebenina* and for their generous gift of exemplary specimens to Carnegie Museum; Mr. Neil D. Richmond, Curator of Environmental Studies, and Dr. Clarence J. McCoy, Jr., Curator of Amphibians and Reptiles, Carnegie Museum, for valuable discussion and help with the herpetological literature.

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